

Well folks the PPRS organization is off to a good start. As of this date we have 64 paid memberships. This is enough to keep us going for awhile but, is only half of what we need for a long-lived organization. In order to keep from burning out a smaller membership we need new people to pass things on to. So.... invite your packet radio friends to join us.

On two meters we have 145.01, 145.03, 145.05, 145.07 and 145.09 MHz coordinated for packet radio in northern California. Additionally, 146.58 MHz is coordinated as non-voice. A casual listen in the evenings or on weekends shows activity on 145.01 and 146.58 and not much else. Eventually, the KA6M-1 and KA6M-2 pair will be moved to 145.09. That sets us in the position of using two of our coordinated frequencies. Lets think of using the remaining frequencies when possible. If you want to put up a repeater, how about one for local service on 145.03 or 145.07. Lets use what we have before we lose it.

Not everybody is familiar with the history of packet radio here in northern California. So I thought I'd provide a little background on our organization for you. -- In the late 70s Canada allowed Amateur radio operators to use digital codes for communication other than Baudot and CW. The Vancouver Amateur Digital Communications Group (VADCG) spear-headed by Doug Lockhart, VE7APU created a protocol and hardware set to allow digital communications amongst themselves. The hardware they created is the "Vancouver Board" that is still in wide use here in the SF bay area. In 1980 the FCC allowed US amateurs to also utilize other digital communication modes. Hank Magnuski, KA6M being aware of the VADCG work thought it appropriate that the San Francisco bay area should become a hot-bed of digital activity. Hank patterned a repeater on a modified version of the VADCG protocol and put that repeater on the air in December 1980. Recognizing the need to have people to communicate to, Hank then went around to all the radio clubs in the the area showing what Packet Radio was all about. From his demonstrations he recruited a small following to attend a series of lectures (in the fall of 1981 through the spring of 1982) about this emerging technology. In 1981 Hank put KA6M-1 on the air as a mail box. This served through the emerging years as the "other station" to talk to. A QSO with a person required an appointment, so, we all gratefully appreciated a station to test our equipment against. Meanwhile in the Washington DC area, Packet Radio was beginning to spread. Paul Rinaldo, W4RI organized the first Conference on Amateur Digital Communications in Gaithersburg, Md in the fall of 1981. At this meeting the seeds were planted to supplant the Vancouver protocol with something to accommodate a larger user community. Terry Fox, WB4JFI authored a new protocol (which became AX-25) to replace the Vancouver protocol and still run on the Vancouver boards. At this time (82-83) most of the SF bay area was running Vancouver boards with a few of the then new TAPR boards trickling in. In early 1983 Hank switched KA6M-1 & 2 over to the new AX-25 protocol. Meanwhile, Hanks entourage (in the spring of 1982) decided to form the Pacific Packet Radio Society as a loosely organized Packet Radio interest group. Hank continued to act as the primary motivator behind the group with help from a cadre of interested helpers. Without any organized actions except to hold occasional meetings the PPRS continued to drift along. The original group was interested in Packet Radio as a technology not as a communications mechanism. In fact there were some heated discussions about what use this packet stuff was good for. Thus, as the group found out how to make the basic function work we/they drifted to other interests (83-84). As a result the original cadre had begun to fall by the wayside. In fact, were it not for the KA6M-1 mail box, packet radio could have died out in the bay area for lack of activity. Then in 1984 the packet radio boom started to take off, thanks to the efforts of the TAPR group. PPRS was having trouble getting enough people to keep it going. Without a cadre to continue the PPRS as it has emerged, PPRS was in danger of disappearing. A few of the old cadre and some newer Packet converts recognizing the situation have stepped forward to see to it that PPRS continues. These folks believe an organized group may continue to serve the needs of the community and has put the PPRS on a footing toward that goal. Which brings to the present, where this re-convened PPRS is preparing the material you are now reading.

Hope you have found this of some interest. 73  
Dave Engle, KE6ZE



SEE YOU AT THE FAIRE!

As most of us already know, the 4th Annual ARRL Computer Networking Conference will be held at Moscone Center, San Francisco, as a part of the 10th Annual West Coast Computer Faire, on Saturday, March 30 from 1030 to 1600 as previously announced. In addition, there will be a "Network Management Meeting" on Friday, March 29, from 2000 to midnight at the S.F. Pizzeria, 418 Beach Street. From the Hotel Union Square, take the Bay & Taylor Car to the end of the line, walk two blocks down Taylor St. Everyone is welcome. It is expected that the predominant topic will be "layer 3 networking." Turn your nightmares into dreams! Data communications software at a High Level.

### FOR BREAKFAST AT 0830

Saturday and Sundays, we will meet at Tad's Restaurant, 120 Powell St. Dinner on Saturday night is at New Joe's Restaurant, 347 Geary St (between Powell & Mason) at 2000. A count of those wishing to attend dinner is needed by Noon on Saturday.

A Westnet organizational and planning meeting will be held after the dinner. Location to be announced. This meeting is open to all who are dedicated towards linking and specially to digipeater site organizations and owners. Network nodes, frequencies, Baud rates, digipeater locations will be discussed. We will not discuss Level Three software as that is another topic. At present, our goal is to establish a 9600 BPS "backbone" system, utilizing 220 MHz and dual-port TNCs (Xerox 820, with the KE3Z ROMs). This is an affordable way to go and will permit staggering of neighboring 2-meter LANs in order to reduce congestion as well as to permit all "long haul" work away from the heavily-trafficked entry and exit frequencies on 2 meters.

It will be clear to everyone that future plans for Packet are being made so that entry and exit to and from the "backbones" can ALWAYS be achieved through means of currently available standard equipment operating under AX.25, 1200 BAUD/1000 HZ SHIFT via the normal VHF-FM simplex allocations, via the 2 meter band. The advent of "high speed" 220 MHz technology means that we are going to be able to implement a new transport vehicle at the inter-LAN level and there will be NO REQUIREMENT to modify your present TNC or radio!

Westnet will attempt to adopt a formal structure wherein we can expedite the coordination of such linking within the Pacific area, from as far east as Colorado, south to New Mexico and San Diego, and north to and from Alaska. It is hoped that when Level 3 technology becomes available and affordable that we will have already established nodes and hardware to downlink the "top backbone" into secondary arteries and into the 2-meter LANs. Given the immensity of the Western area and our limited resources, Westnet will attempt this awesome task, hopefully in the most efficient manner!

On Sunday, March 31, a meeting of the ARRL Digital Communications Advisory Committee (DCAC) will be held at a location yet to be announced. Participants include only Members of DCAC but as space permits interested observers may attend.

PPRS is manning an Exhibit Booth (spaces 833-835) on all 4 days of the Faire. Demonstrations and explanations of Packet Radio in operation will be given. Help is needed to man the booths. Please see Ken Chong, WB6MLC if you wish to be of assistance.

### FREQUENCY COORDINATION COMMITTEE NEEDS YOUR INFORMATION

THE PPRS FREQUENCY COORDINATION COMMITTEE IS ATTEMPTING TO KEEP TRACK OF DIGIPEATER, GATEWAY, AND MAILBOX ACTIVITY IN NORTHERN CALIFORNIA. CERTAIN SPECIFIC FREQUENCIES ARE RECOMMENDED FOR CERTAIN KINDS OF USE FOR THE PURPOSE OF MAXIMIZING OUR EFFECTIVENESS (SEE PPRS NEWSLETTER MARCH 1985). WE WOULD LIKE TO COORDINATE FREQUENCIES FOR YOUR PLANNED DIGIPEATERS, MAILBOXES, GATEWAYS, OR WHATEVER BEFORE YOUR SITE ACTUALLY GOES UP. IF YOU WISH WE WILL ALSO COORDINATE YOUR SITE WITH NARC SO THAT YOU WILL HAVE OFFICIAL SANCTION THROUGH OUR ALREADY EXISTING SYSTEM SANCTION (OR YOU ARE FREE TO APPLY INDEPENDENTLY IF YOU WISH).

CERTAIN NEEDS ARE IN EXISTENCE, WE NEED MORE MEDIUM TO HIGH LEVEL DIGIPEATERS ON 145.03 MHZ FOR PACKET COMMUNICATIONS THAT DO NOT REQUIRE THE DX LINKS ON 145.01 MHZ, BUT NON-THE-LESS REQUIRE AN INTERMEDIATE DIGIPEATER BECAUSE THE STATIONS INVOLVED CANNOT WORK DIRECT. WE CAN USE A REDUNDANT HIGH LEVEL DIGIPEATER ON 145.01 MHZ AS A BACKUP TO W6AMT BECAUSE THE ENTIRE DX LINK WILL FAIL WITHOUT BACKUP IF W6AMT IS DOWN. WE CAN USE ANOTHER DIGIPEATER ON 145.09 MHZ WITH KA6M-1, KA6M-2, K6VCO-2, AND W3VS-1 MOVE THERE LATER THIS MONTH AS KA6NAN-1 DOES NOT PLAN TO MOVE AT THIS TIME. WE CAN USE SOME MORE "EASY" BBS SYSTEMS ON 145.09 MHZ PROVIDING EASY ENTRANCE AND EXIT AND SHORT MESSAGE AND QST SERVICE. IN ORDER OF PRIORITY, THE 145.03 MHZ DIGIPEATERS ARE THE MOST NEEDED IN ORDER TO TAKE THE LOAD OFF OF 145.01 MHZ. CONTACT THE PPRS FREQUENCY COORDINATING COMMITTEE CHAIRMAN AND TELL HIM OF YOUR PLANS.



LINKING IS PROGRESSING SLOWLY. LOOK FOR W6AMT-2 TO BE OPERATIONAL BY THE END OF APRIL( ALSO WA6GML-1 ) . BOTH WILL GIVE US 3 HOPS INTO SOUTHERN CALIFORNIA. WHAT IS HOLDING THEM UP NOW IS OBTAINING SANCTION FOR 145.01 MHZ FROM THE SOUTHERN CALIFORNIA SANCTIONING BODY (TASMA). THIS IS EXPECTED THIS MONTH. CURRENTLY, W6IXU IS MIXING AUDIO THROUGH A 440MHZ REPEATER TO WB6DAO WHO(ALSO IS MIXING AUDIO) AND DIGIPEATING OUT TO K6TZ ON 145.36 MHZ WHERE THE REST (MOST) OF SO CAL'S PACKET ACTIVITY IS. TO LAST MONTH'S MAP PLEASE CHANGE W6BXN-1 AT MOUNT BULLION TO K6IXA-1 FREMONT PEAK. ADD W6AK-5 ABOVE PLACERVILLE AT 2300' (EXPECTED MAY 1). WE ARE LOOKING FOR SITES GOING NORTH TO MOUNT SHASTA. ALSO, SACRAMENTO VALLEY STILL NEEDS A HIGH-LEVEL SITE. ANYBODY WITH INFO OR ACCESS TO SITES GOING NORTH FROM SAN FRANCISCO BAY TO OREGON (COASTAL OR INLAND ROUTES), PLEASE CONTACT THE PPRS FREQUENCY COORDINATION CHAIRMAN AT YOUR EARLIEST CONVENIENCE. WE WOULD LIKE TO FILL THE HOLES IN SONOMA, MENDOCINO, HUMBOLDT, LAKE, DEL NORTE, SISKIYOU, SHASTA, BUTTE, TEHAMA, GLENN, SUTTER, COLUSA, AND YUBA COUNTIES BY THE END OF THE YEAR IF POSSIBLE. OREGON IS WORKING DOWN FROM PORTLAND AND MAY BE ABLE TO JOIN US AT MOUNT ASHLAND WHEN WE REACH SHASTA.

#### GRUBSTAKING PACKET PROSPECTORS

WE WILL MAKE THIS RESOURCE LIST AVAILABLE TO ALL WHO NEED IT. PLEASE SEND SITE AVAILABILITY/POSSIBILITIES, EQUIPMENT AVAILABILITY (SPARE TNCs, RADIOS, ANTENNAE, POWER SUPPLY, CAVITIES, ETC), CONTACT INFO, ETC ASAP. WE WILL DO ALL WE CAN TO COORDINATE THE EFFORTS OF OUR MOUNTAIN CLIMBER DIGIPEATER ADVENTURERS AND AID THEM IN THEIR QUEST.

RUMOR HAS IT THAT TAPR IS PLANNING TO OFFER A NEW KIT. IT IS A 220 MHZ XTAL CONTROLLED RIG (MINUS THE AUDIO STAGE, ETC) WITH STEVE GOODES 9.6 K BAUD MODEM COMBINED INTO ONE BOARD FOR LESS THAN \$200. THIS WOULD ALLOW US TO DO 9.6K BAUD - 220 MHZ DIGIPEATING BACKBONE SYSTEM VERY INEXPENSIVELY IN CONJUNCTION WITH THE XEROX 820 DUAL PORT TNC AS DEVELOPED BY THE ARRL LABORATORIES. THE DEVELOPEMENT OF THIS 220 MHZ , 9.6K BAUD BACKBONE SYSTEM WILL ALLOW US MUCH GREATER REDUCTION OF LOADING ON OUR DX CHANNELS AND ALSO PERMIT NEIGHBORING LANS TO STAGGER THEIR FREQUENCIES, ETC...

DONALD SIMON, NI6A -PPRS FREQUENCY COORDINATION CHAIRPERSON- 2327 ALVA AVE. EL CERRITO,  
94530- 415-237- 1381

The Vancouver or VADCG board.

When the Canadian government allowed their amateurs to utilize alternative digital communications methods, a group of hams in Vancouver, British Columbia formed the Vancouver Amateur Digital Communications Group (VADCG). In this group Doug Lockhart, VE7APU designed a printed circuit board to support their needs for reliable ASCII communications. This board was the mainstay for packet radio up until the time the TAPR board was available. About 75 of these boards were sold in the bay area. But, only about 50 were ever made to work. The boards became widely available in the bay area because Hank, KA6M in 1981 and the following years made batch purchases of the boards and two of the key chips on the board (8273 HDLC & 8250 SIO). Hank then re-sold the parts to the eagerly waiting local community. These boards continue in use in the bay area. The Washington, DC area was another area of intense use of these boards and they continue to heavily utilize these TNCs.

The VADCG Terminal Node Controller (TNC) is a double sided printed circuit board of about 5" x 8". The TNC has provision for parallel or serial connection to a computer or terminal. The serial port being handled by the 8250 SIO chip and the parallel port by a 8255 PIO chip. To my knowledge no use was ever made of the parallel port and the users never wired it up for parallel operation (no software was available for parallel operation either). The main processor on the board is an 8085 with a 4.9152 MHz crystal clock. The modem interface is handled by the 8273 chip in HDLC mode. RAM memory is eight 2114 chips and four 2708s are used for ROM. There are various other support chips on the board also. Power required for the board is +5, -5, +12, and -12 volts. Most people put a -5 volt regulator on the board to supply that voltage for the 2708s.

One of the biggest troubles with the board is its lack of a Push To Talk (PTT) contact closure. Most people put a reed relay or open collector PTT circuit on the board triggered off the modem request to send line. The second problem (?) with the board as a TNC is that it does not include a modem. The Vancouver group made a modem PC card also. But, not many were used in this area. Generally most users bought surplus modems and used them (still do, mostly) externally.



Several modifications were made to VADCG boards. Most of them were to get rid of the 2708s. This entailed a new addressing chip and the new ROMs which were mostly 2716s or 2732s. This usually entailed cutting traces and wire wrapping in another chip on the board. More recently the AMRAD group in DC came out with a daughter board that uses wire wrap sockets to stick into the existing sockets. This daughter board allows the choice of different RAM and ROM chips by strap selectable options. Perhaps the ultimate modification of the VADCG board is the Ashby board. The Ashby board is a re-packaged version of the VADCG board using up-to-date RAM/ROM chips. The Ashby board was more popular on the east coast and not too many showed up out here.

The software utilized in the VADCG board was not supplied by the VADCG. The software originally created by Doug was not used here in the US. What was/is used is Doug's software as modified by Hank, KA6M and a cast of others. The command set used in the VADCG TNC is different from others currently available. But, on the radio side the software generates packets compatible with all the other TNCs in use. There is also a set of software available to make the board into a repeater. Unlike the TAPR and GLB boards the VADCG software can not perform both functions simultaneously. For those of you that have a board, new PROMs can be gotten from KE6ZE, N6FQR or (?) KA6M.

By current TNC standards the VADCG board was fairly primitive. But in the late 70s Doug did not know how packet radio would evolve. The board served a valuable service and got most areas up and running a local net. It allowed the use of different modems, not locking in a particular type. The community eventually selected the 201s we now use. As an example it also served to point the way for Lyle to design the TAPR board. Today you can get a TNC complete with software, cabinet, power supply, modem and radio interconnects from one place and at one time. When the VADCG board came out this was not the case. However, the board served as a good starting point. The amateur service owes a debt of gratitude to Doug Lockhart for his foresight. de KE6ZE

It's rather presumptuous for any of us to tell any other the "correct" way to operate or what are the "right" procedures to use while operating on any one packet frequency at any given time. However, we strongly feel that there ARE some procedures that contribute to interference and others that are positively beneficial. So that we may best utilize our spectrum certain "recommended" good operating procedures will be discussed and "guidelines" recommended. We cannot mandate anything, but can suggest and open up the field for discussion and improvement. Let us hear from you ideas and comments about some of these suggestions and in the future PPRS will publish a "LIST OF RECOMMENDED GOOD OPERATING PROCEDURES FOR PACKET RADIO".

Last month we recommended some procedures for working on the DX link on 145.01 Mhz. This month we will get a little controversial and desire your response to this touchy subject; mailbox operation. Firstly let it be said for all who may walk away from their tncs, mailboxes, digipeaters, etc unattended, make sure your retry number is set at some finite figure (try 10 or 15). The other day a station was connected to a mailbox on 145.01 Mhz and tried to disconnect from it by using the command B on the mailbox. This was not a valid command on this particular mailbox and there was no disconnection. The operator then evidently walked away or turned down his audio (one or the other) while his rig kept on retrying the B command because of either a link failure or mailbox timeout, this station kept on sending unacknowledged Bs to the mailbox for a few hours every couple of seconds. The operator obviously walked away from his station leaving his retry on infinite not realizing that it was jamming up our 145.01 link. Theoretically this could have gone on for days and weeks. This was not the mailbox system operator's problem, because his machine was correctly set and did disconnect, but it was the users fault. However, mailboxes also can be at fault and this recommendation of finite retry settings should be heeded by all unattended machines.

KA6M-1 is a sophisticated computer on 146.58 Mhz (soon to be moved to 145.09 Mhz) operating a Data General (DG) computer (Unix System). It really is not set up for the uninitiated and many have found it difficult to operate. A few suggestions; use WB5VUL-1 or W6IXU for mailboxes. They are set up as BBS for easy entrance and exit and are far less cumbersome. The DG is a great service that Hank, KA6M has provided for many years as an actual computer system, as a host system providing records, files, electronic mail service, as well as a mailbox, but it is mainly for those who are willing to learn the UNIX system and learn how to operate it.



Some pointers on the DG: If you find yourself in a long run off and wish to escape it is not good operating practice simply to disconnect, or turn your rig off, or walk away. This hangs up the DG for others. You must log off in a certain manner or no one else will be able to use it afterwards (unpolite). To get out of a long file printout send ctrl v ctrl c ctrl v ctrl a. This will put you back into prompt mode. Have patience it takes the DG a few minutes to recognize these control characters. Send ctrl v ctrl c ctrl v ctrl b if you wish to log off and get out of a long file. This will put you in a logoff state but you still must disconnect from the TNC. Wait until the Gamma Technology Sign is posted and the DG is at rest then disconnect. If you don't disconnect you will hang up the KA6M-1 TNC. To log off normally on the DG send BYE at any prompt then wait until the logoff procedure goes thorough to the end where the Gamma Technology Sign appears and the DG is quiet, then disconnect. Always wait until the word "DISCONNECTED" appears (TAPR BOARDS) on screen before pulling the plug as it might take more than one try. Anything less than these operating procedures as outlined will be considered selfish and inconsiderate to others and cannot be recommended by the Frequency Coordination and Use Committee. On the other hand don't be afraid to make some mistakes. No one is perfect. But those who continuously find themselves in trouble or leave the machine inoperable for others after every time they use it, should ask for assistance from some of the more experienced users or go to the mailboxes that are designed for specific mailbox operation. Have fun, but at the same time be considerate. This author is not without his faults and has made many mistakes and is not attempting to discourage anyone from using the DG. My thanks to those who took their time to explain its use to this humble beginner.

Another controversial topic that needs your comments relating to the DG or other mailboxes is how long should one person tie it up when others are waiting? Obviously if other's are waiting some sort of consideration should be taken in account. Next question, how do we know someone is waiting? Some mailboxes tell the operator that someone is waiting, but the DG does not have this enhancement. This is where we want your input. Obviously if everyone who used the DG did so for 2 hours at a time we could only get 12 users/ day. On the other hand, there are times that it goes idle for 6 hours or more (usually between midnight and six AM). Let us in the interim suggest that we limit ourselves to 45 minute log-ons during prime time (primetime is 5 pm to 11 PM weekdays and 7 AM to 11PM Holidays and Weekends). After 45 minutes if you still wish to use the mailbox logoff and disconnect. Wait 15 minutes for other users and if none, one can assume it is permissible to log back on. What about non-primetime lengths? Certainly 1 1/2 hours at a time should be more than adequate. If you need to use it more, that's alright just logoff and disconnect and wait for 10 minutes (during non-primetime) and go back to it. I see no problem with those people that have hours of mail to read or files to download etc using the DG for longer TOTAL time than this per day as many of us can testify it is idle many times for many hours. We are talking about continuous times and leaving breaks for other users. Further if you are a recent user and have logged off and someone else logs on immediately, it is not good practice to log back on as soon as the person who followed you logs off. Maybe someone else was waiting also. Its hard to define hard-and-fast rules for every situation and there is no authority nor penalties that we are claiming to represent nor dispense. Your comments on these procedures are welcomed. Certainly 3 AM in the morning we have different considerations than 3 PM in the afternoon.

by Don Simon, NI6A

#### DIGIPEATER SITES NEEDED-SPECIAL REQUEST

OF COURSE WE NEED RADIOS, TNCs, ANTENNAS, INSTALLERS/HELPERS, ETC. TO MAKE THIS LINKING WORK, BUT RIGHT NOW OUR PRIMARY RARE COMMODITY ARE LINKING SITES. ANYONE OUT THERE WITH SITE ACCESS TO BOTH SACRAMENTO AREA AND THE BAY AREA? WE ALSO HAVE SOME HOLES IN CENTRAL AND EAST CONTRA COSTA COUNTY. ANY HELP TO GET OVER THE EAST BAY HILLS? WE NEED SITES IN SONOMA COUNTY AND NORTH. W6AMT-3 AT BIG ROCK HAS BEEN DELAYED INDEFINITELY AND OUR OREGON LINKING TO SHASTA (NORTH) IS BEING HELD BACK FOR LACK OF SITES. PACKET HAS TREMENDOUS APPLICATIONS FOR RED CROSS AND RACES USE. STATE OFFICE OF EMERGENCY SERVICES AND THE CALIFORNIA DEPT. OF FORESTRY HAS RECENTLY PURCHASED TNCs. MAYBE SOME OF OUR MEMBERS MAY BE ABLE TO CONTACT SOME OF THESE RACES OR CDF AGENCIES/GROUPS AND ATTEMPT A HIGH LEVEL SITE (SITES) FOR OUR NORTHERN NEIGHBORS? PLEASE KEEP ME INFORMED AS I AM ATTEMPTING TO ACT AS A COORDINATOR/CLEARINGHOUSE FOR EQUIPMENT/FREQUENCIES/RESOURCES IN THIS LINKING EFFORT.

Don Simon, NI6A- Freq. Coordination and Use Committee-



PACKET PUBLICATIONS :

FOR THE NEWCOMERS IN PACKET RADIO THERE IS A REALLY EASY TO UNDERSTAND AND INEXPENSIVE BOOK AVAILABLE FROM RADIO SHACK CALLED "UNDERSTANDING DATA COMMUNICATIONS". PRICE IS \$3.95 AND IT TAKES YOU BY THE HAND FROM SQUARE ONE (NO PRIOR EXPERIENCE NECESSARY) AND GOES INTO MODEMS, PROTOCOLS, ERROR CONTROL, ARCHITECTURE AND PACKET NETWORKS, NETWORK DESIGN AND MANAGEMENT, ETC. NOT FOR THE PROFESSIONALS BUT GREAT FOR US NOVICES!

IF YOU ARE SERIOUS AT ALL ABOUT KEEPING UP ON WHAT IS HAPPENING IN REGARD TO LINKING AND LEVEL THREE NETWORK DESIGN, HARDWARE HAPPENINGS, ETC, A FEW SUBSCRIPTIONS ARE IN ORDER:

SUBSCRIBE TO "GATEWAY" (THE ARRL PACKET-RADIO NEWSLETTER). IT IS A NATIONAL CLEARING HOUSE ON PACKET SUBJECTS AND HAPPENINGS AND IS A MUST FOR THOSE WHO WANT TO STAY ON TOP OF THE CHANGES AND DEVELOPEMENTS. \$6/YR FOR ARRL MEMBERS. \$9/YR FOR NON-MEMBERS. FIRST CLASS RATES ADD \$5/YR. GATEWAY C/O ARRL -225 MAIN ST. NEWINGTON, CT., 06111

FOR TOP ARTICLES ON NETWORKING, TNC DEVELOPEMENT, SOFTWARE, HARDWARE, AND JUST FINE QUALITY AND RELEVANT PACKET INFO ITS HARD TO BEAT THE TAPR NEWSLETTER CALLED, "PACKET STATUS REGISTER". IT COMES WITH A TAPR MEMBERSHIP. YES THEY DO TALK ABOUT THINGS OTHER THAN JUST THE TAPR TNC. GET SOME QUALITY INFO, JOIN TAPR: TUCSON AMATEUR PACKET RADIO CORP- P.O. BOX 22888, TUCSON, AZ 85734 - INCLUDE YOUR CALLSIGN, ADDRESS, HOME/WORK PHONES AND SIGN TO THE FACT THAT YOU ARE OFFICIALLY APPLYING FOR MEMBERSHIP IN TAPR. ENCLOSE CHECK FOR \$12/YR DUES. YOU WILL RECEIVE 6 FB ISSUES OF THE "PSR" AND WILL BE PART OF A TOP NOTCH ORGANIZATION.

ANOTHER GOOD PACKET ORGANIZATION IS THE "AMRAD NEWSLETTER" PUBLISHED BY AMRAD (AMATEUR RADIO RESEARCH AND DEVELOPEMENT CORP)-MAIL TO: WILLIAM PALA, WB4NFB-5829 PARAKEET DR.- BURKE, VA 22015- \$15/YEAR- MAKE CHECK OUT TO AMRAD- LIST YOUR INTERESTS (PACKET, RTTY, SPREAD SPECTRUM, DEAF TTY), CLASS LICENSE, CALL SIGN, COMPUTERS YOU OWN (LIST MICROPROCESSOR TYPE), ARRL MEMBER?, AND AGREE TO SUPPORT THE PURPOSES OF THE CORPORATION WITH YOUR SIGNATURE. THIS IS A VERY ADVANCED TECHNICAL NEWSLETTER, HOWEVER ALOT OF THE TOPICS ARE NOT EXCLUSIVELY PACKET. THEY HAVE SOME EXCELLENT ARTICLES ON THE XEROX 820 COMPUTER, SPREAD SPECTRUM, LEVEL 3 PACKET, ETC. NEWSLETTER IS INCONSISTENT AND SOMETIMES PROVINCIAL (EAST-COAST ORIENTATED).

A MUST FOR ANYONE AT ALL INTERESTED IN PACKET NETWORKING IS THE "THIRD AMATEUR RADIO COMPUTER NETWORKING CONFERENCE" PAPERS PUBLISHED BY THE ARRL AT \$10. THE FOURTH ANNUAL ARRL COMPUTER NETWORKING CONFERENCE PAPERS SHOULD BE AVAILABLE AT THE CONFERENCE THIS MARCH 30 IN SF AND WILL CERTAINLY BE A VALUABLE ASSET TO THOSE WHO WISH TO KNOW THE LATEST AND MOST RELEVANT TOPICS AVAILABLE IN AMATEUR RADIO PACKET DEVELOPEMENT.

THE XEROX 820 COMPUTER BOARD MOD NOW AVAILABLE  
SEND AN 8 INCH SSSD DISK WITH A SASE TO GATEWAY C/O ARRL AND RECEIVE THE SOURCE, DOCUMENTATION, AND INSTRUCTIONS ON HOW TO TURN YOUR XEROX 820 BOARD INTO A DUAL PORT DIGIPEATER (YOU ADD THE RADIOS AND MODEMS OF COURSE) BY DIRECT REPROGRAMMING OF THE PROMS (NO DISK DRIVES NEEDED). THIS TNC CAN SUPPORT BOTH HF GATEWAYS & UHF GATEWAYS, AND 9.6K BAUD TO 1200 BAUD DUAL PORT SYSTEMS. A FEW MODS ARE REQUIRED ON THE BOARD. DO YOU WANT A REAL NICE MAILBOX PROGRAM AND HAVE A XEROX 820? SEND A SASE AND A BLANK 8 INCH SSSD DISK TO HANK OREDSON, WØRLI, 19 NORTH HILL RD, WESTFORD, MA, 01886. YOU WILL RECEIVE A FB MAILBOX PROGRAM THAT WILL RUN ON THE XEROX 820. DUAL 8 INCH DISK DRIVES ARE REQUIRED. THIS PROGRAM OFFERS STORE AND FORWARD MESSAGE SERVICE PLUS SUPPORTS A GATEWAY FUNCTION, ETC.



## 820 column

The Xerox 820 is being used by packeteers for a variety of applications. In this column, we'll look at what the 820 is, give some example applications, and tell you how you can get one for your very own.

### What is an 820?

The 820 is a small computer sold by Xerox Corporation. It is a single board Z80-based computer with 64K of dynamic RAM. The board also contains a 80 character by 24 line display controller, a single density floppy disk controller, a parallel keyboard input port, a 16 line parallel port, a timer chip, and two RS-232-C ports. The 820 board is very similar to the Big Board computer sold by Digital Research of Texas. In fact, Xerox bought non-exclusive rights to the Big Board computer and used it as the basis for the 820.

The main reason that packeteers are using the 820 is its price. Factors such as Xerox's announcement of the 820-II have left Xerox with a lot of surplus 820-I boards on their hands. They sell these boards through their surplus outlet in Dallas for \$50 for a used board or \$100 for a new board. At these prices there are no guarantees or returns, so be sure you have enough electronic and computer knowledge to be able to repair the board if it is not working and can assemble the remaining pieces needed to turn the board into a working computer system.

### What do I get for \$50?

You get the single computer board that made up the Xerox 820. This is not a "bare board"; the board is completely stuffed. To turn it into a usable computer you need the following additional pieces:

1. Monitor. The Xerox 820 is designed for a monitor that has separate sync and video inputs. The Xerox surplus outlet sometimes has monitors available for around \$35 to \$50. Some people have tried to convert the 820 to composite video and I have schematics of several circuits if you already have a composite video monitor.
2. Floppy disk drives. The 820 can support up to two 8 inch or 5 1/4 inch single density single sided disk drives. Used 8 inch drives are available for around \$50 to \$100. If you can get two in a cabinet with power supplies, you are all set.
3. Power. The 820 requires +5V, +12V, and -12V. Several good switching power supplies are available. I have used the one sold by BG Micro for \$37.50. It can power the 820, a 12V monitor, and possibly some 5 1/4 inch drives.
4. Keyboard. The 820 requires a parallel output ASCII keyboard with a negative strobe. For those of you with serial keyboards, I have a schematic for a simple serial-to-parallel converter.
5. A box for all the pieces.
6. Cables. The hardest cable to make is the disk cable that connects the disk drives to the 820 board. Xerox sells the cable for connecting 5 1/4 inch drives, but they no longer have any cables for 8 inch drives.



## What can I do with it?

Here are some uses for the 820 once you get it up and running.

1. You can use it as a CP/M computer. This is the original use of the 820.
2. You can use it as a packet TNC. Phil Karn, (KA9Q) has written a packet radio TNC for the 820 using the Aztec C compiler for the 8080/Z80 running CP/M. Since the program is written in C, this would be a good program for anyone interested in modifying or customizing TNC programs. In addition to the 820, you'll need a 202 modem, and a small board to recover clock from the modem data. The modem can be a surplus 202 modem or you can build a modem. The small board to recover the clock was described in the AMRAD bulletin.
3. You can run a packet mailbox. Hank Oredson, WORLI, has written a mailbox program designed to talk to the TAPR TNC. The program also will act as a packet gateway if you hook it up to two TNCs. The newest version even includes a store-and-forwarding of messages!
4. You can use it for experimentation in higher level protocol design. Several groups plan on using the 820 as the basis of their efforts into higher level packet protocols.
5. You can use it as the basic for Digipeaters/Gateways. For this application you would not need to hook up the monitor, keyboard, or floppy disk. Just add modems and hardware to recover modem clock. A gateway program for the 820 board is available by writing to Gateway Magazine c/o ARRL.

## How can I get one?

The phone number for the Xerox Surplus outlet is (214)960-3367. Their hours are Tuesday-Friday, 9AM-4PM texas time. They accept phone orders and Visa/MasterCard. If they don't have any boards the day you call, you'll just have to try again. Although they will tell you when they think they will be getting more boards, they will not put you on a waiting list. Other items that you might be interested in are: monitors, disk drive cables, power cables, power supplies, floppy disk cabinets, and 16/8 boards. See the ad in the March issue of Computer Shopper for more information.

--- Bill Danielson, N6FQR

From the Editor...

Many thanks to those who have contributed to this issue of the NEWSLETTER. Also, thanks to those who have participated at the meetings and to those who have thoughtfully remitted their DUES and Membership Applications. If you hear of someone who has failed to receive his copy of the NEWSLETTER please tell him or her that we need his contribution in order to continue mailing.

Please remember that the next regular MONTHLY PPRS MEETING is to be held at the Ampex Cafeteria, on Broadway, in Redwood City, CA at 8:00 PM on Tuesday, April 2, 1985. We will hear reports from the ARRL Networking Conference Subcommittee Chairman, and from the Ad Hoc Group on Digital Communications. To reach the Ampex Cafeteria from southbound 101 take the Woodside Road Exit to Broadway. Turn left on Broadway, head south for approximately one mile and you will find the Ampex Cafeteria in a fountain-and-pool area on your right. Ample free parking on Broadway.

--- Rich Collins, NT6V, Editor

Deadline for the May NEWSLETTER is Thursday, April 18, 1985



ARRL Fourth Computer Networking Conference

by

The American Radio Relay League and the Pacific Packet Radio Society

Moscone Center Room 232, March 30th, 1985

- 10:30 Opening Remarks and Keynote Speech  
Paul Rinaldo, American Radio Relay League
- 10:45 Pete's Packet Primer  
Peter Eaton, SLAPR
- 11:30 Applications of Packet Radio Papers -  
"Packet Radio Development - 1985"  
Lyle Johnson, TAPR  
"The Implications of Traditional Operating Practices for Net Design"  
Gwyn Reedy, FADCA  
"Packet Radio for Distance Teaching in the Third World"  
Phil Gray, University of Oregon  
"Packet Radio and the National Hurricane Center"  
Joel Kandel
- 12:15 Papers from the Proceedings - Operational Reports  
"The Realities of Packet Radio in the ARS circa 1985"  
Harold Price, LAPG  
"The FADCA Gator Link 1"  
Howard Goldstein, FADCA, and Ted Huf, FADCA  
"EASTNET: A Year Later"  
Bob Bruninga, AMRAD  
"Computer Networking in Japan, 1985 and Onwards"  
Robert Richardson, Richcraft Engineering  
"Activity Report of Japan's PARNET"  
Yamazaki, et al
- 13:30 Technical Papers - Part I  
"TCP/IP: A Proposal for Amateur Packet Radio Levels 3 and 4"  
Phil Karn, AMSAT  
"Addressing and Routing Issues in Amateur Packet Radio"  
Phil Karn, AMSAT  
"Of Virtual Circuits, Datagrams, and the Circular File"  
Terry Fox, AMRAD  
"CCITT X.224 Transport Layer Protocol Basic Description"  
Terry Fox, AMRAD  
"Communications Protocols for the Network and Transport Layers"  
Gordon Beattie, Jr., RATS, and Tom Moulton, EIES  
"Proposal: Recommendation AX.121NA, a Numbering Plan"  
Gordon Beattie, Jr., RATS, and Tom Moulton, EIES  
"X.3 and X.28 Protocols for Terminal Node Controllers"  
Douglas Lockhart, VADCG  
"AX.25 Net Operation in the Connected Mode"  
Robert Richardson, Richcraft Engineering
- 15:15 Technical Papers - Part II  
"The RUDAK Packet Radio Experiment for Phase III-C"  
Karl Meinzer, AMSAT-DL and Hans Peter Kuhlen, AMSAT-DL  
"Modifying the Hamtronics FM-5 for 9600 bps Operation"  
Steve Goode, CAPRA  
"The Frequency Agile Message System"  
Dave Borden, AMRAD  
"Packet Radio Timing Considerations"  
Dave Engle, PPRS  
"A More Watchful Watchdog for Microcomputers"  
Paul Newland  
"Another Application Note Describing a Low-Power RS232 Interface"  
Paul Newland  
"A Few Thoughts on User Verification Within a Party-line Network"  
Paul Newland



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